

## **GEM based fast neutron detector for fusion and spallation sources experiments**

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Fast neutron detectors with a sub-centimetric space resolution are required in order to qualify neutron beams in applications related to magnetically-controlled nuclear fusion plasmas and to spallation sources such as ISIS. A medium size 20 x 35 cm<sup>2</sup> active area) nGEM detector has been realized for the CNESM (Close Contact Neutron Emission Surface Mapping) diagnostic system that is being designed for installation behind the beam-dump of the SPIDER experiment (the NBI prototype for ITER) and as a beam monitor for fast neutrons beam lines at spallation sources such as ChipIR at ISIS. The detector is a triple GEM gaseous detector equipped with a 2 mm thick polypropylene layer used to convert fast neutrons into recoil protons through the elastic scattering process. The read out anode is composed by 256 PADs, each with dimensions of 13x22mm<sup>2</sup>. In this presentation the measurements made on the ROTAX beam-line at ISIS will be presented, with particular attention to the measurement of the uniformity of the detector response along the active area. Moreover, the measurements of the nGEM counting rate as a function of the detector gain and of the time are presented, together with a preliminary data-analysis software able to reconstruct a neutron beam pattern similar to the one expected in the SPIDER experiment.

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